510(k) Summary

FEB 0 6 2003

Custodiol® HTK Solution

Common/Classification Name: Isolated Kidney Perfusion and Transport System and Accessories, 21 CFR 876.5880

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Contact: Dr. E. Schaffner. Prepared: March 20, 2002

A. LEGALLY MARKETED PREDICATE DEVICES

The **Custodiol HTK Solution** is substantially equivalent to the Viaspan Belzer UW Cold Storage Solution, which was cleared by FDA as K944866 on 04 April 1996, with respect to the indication for liver preservation. **Custodiol** is substantially equivalent to itself as cleared in K992209 in regard to physical and chemical characteristics.

B. DEVICE DESCRIPTION

The HTK solution is intended for perfusion and flushing donor kidneys and liver prior to removal from the donor and for preserving the kidney during hypothermic storage and transport to the recipient. HTK solution is based on the principle of inactivating organ function by withdrawal of extracellular sodium and calcium, together with intensive buffering of the extracellular space by means of histidine/histidine HCl, so as to prolong the period for which the organs will tolerate interruption of blood and oxygen supply. Only a small portion of the osmolality of the HTK solution is due to the sodium and potassium. The composition of HTK is similar to that of extracellular fluid. All of the components of the HTK solution occur naturally in the body.

The HTK solution is relatively low in potassium concentration so that residual solution in the transplanted organ poses no danger to the recipient. This is particularly important in organs that take up relatively large amounts of the perfusate, which may find its way into the recipient's circulation.

The HTK solution has a low viscosity, even at low temperatures. This

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characteristic assures rapid flow rates during initial perfusion, allowing the organ to be quickly cooled.

C. INDICATIONS FOR USE

Custodiol HTK Solution is indicated for perfusion and flushing donor kidneys and liver prior to removal from the donor or immediately after removal from the donor. The solution is left in the organ vasculature during hypothermic storage and transportation (not for continuous perfusion) to the recipient.

D. SUBSTANTIAL EQUIVALENCE SUMMARY

The **Custodiol HTK Solution** is a medical device, and it has a similar indications for use as the legally marketed predicate device. While the indications for use statement is not identical to that of the predicate device, the intended use is clearly the same.

The **Custodiol HTK Solution** has the same technological characteristics as the predicate devices. However, the characteristics may not be sufficiently precise to assure equivalence through a point by point comparison. Therefore, clinical data have been collected by the sponsor and others. The performance data clearly demonstrate equivalence.

E. TECHNOLOGICAL CHARACTERISTICS

Both the Custodiol HTK Solution and the predicate device are solutions containing electrolytes, buffering agents, and other materials occurring naturally in the body. Both solutions are intended to reduce metabolism and preserve physiological conditions of explanted organs and tissue during cold storage.

F. TESTING

Several clinical studies have been reported that examined the performance of Custodiol HTK Solution in liver transplants. These studies have collected data on survival rates and other outcome measures. The primary evidence for the equivalence has come from a four-center prospective clinical study carried out under the auspices of the Eurotransplant organization of Leiden, The Netherlands. The four centers were located at Essen, Innsbruck, Gottingen, and Vienna. 228 livers were included in the study.

The predicate device has also been studied in liver transplants, though only one study provided a direct concurrent comparison to HTK Solution.

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This one study was carried out under the direction of Prof. J. Erhard at Essen. The study was a randomized prospective study comparing 30 livers preserved with HTK Solution with 30 livers preserved with UW solution.

Gubernatis summarized the experience at the Medizinische Hochschule Hanover, Clinic for Abdominal and Transplantation Surgery, for livers preserved in UW solution and in HTK solution. This was a retrospective study of transplants conducted at Hanover between 1988 and 1996. During this period there were 515 liver transplants using the UW solution and 232 using HTK solution. These transplants were carried out in 416 patients using UW and 197 using HTK (some were re-transplants). The survival curves for all patients out to five years were essentially indistinguishable and certainly not significantly different statistically.

The following table shows the patient survival at different times in the direct comparison study at Essen, the four-center prospective study, and the Hanover study. These data show that the patient survival rates for HTK-preserved livers are as good as the patient survival rates for UW-preserved livers.

	HTK-Ess	UW-Ess	HTK (4-Ctr)	HTK-Han	UW-Han
1 Month					
3 Months	87%*	80%*			
12 Months			82.5%	71%	72%
30 Months	77%	74%		69%	67%

* Graft survival

G. CONCLUSIONS

The clinical and other performance data amply demonstrate that Custodiol performs as well as the predicate device for liver transplants. This pre-market submission demonstrates Substantial Equivalence as defined and understood in the Federal Food Drug and Cosmetic Act and various guidance documents issued by the Center for Devices and Radiological Health.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

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Re: K020924
Trade/Device Name: Custodiol® HTK Solution for Perfusion and Flushing of Donor Livers
Regulation Number: 21 CFR §876.5880
Regulation Name: Isolated kidney perfusion and transport system and accessories
Regulatory Class: II
Product Code: 78 KDL
Dated: November 12, 2002
Received: November 12, 2002

Dear Dr. Athey:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820); and if applicable, the electronic product radiation control provisions (sections 531-542 of the Act); 21 CFR 1000-1050.

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801), please contact the Office of Compliance at one of the following numbers, based on the regulation number at the top of the letter:

8xx.1xxx	(301) 594-4591
876.2xxx, 3xxx, 4xxx, 5xxx	(301) 594-4616
884.2xxx, 3xxx, 4xxx, 5xxx, 6xxx	(301) 594-4616
892.2xxx, 3xxx, 4xxx, 5xxx	(301) 594-4654
Other	(301) 594-4692

Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97) you may obtain. Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its Internet address http://www.fda.gov/cdrh/dsma/dsmamain.html.

Sincerely yours,

Nancy C. Brogdon

Nancy C. Brogdon
Director, Division of Reproductive,
Abdominal and Radiological Devices
Office of Device Evaluation
Center for Devices and Radiological Health

Enclosure

STATEMENT OF INDICATIONS FOR USE

510(k) Number (if known): K020924

Device Name: Custodiol HTK Solution

Indications For Use:

Custodiol HTK Solution is indicated for perfusion and flushing donor kidneys and liver prior to removal from the donor or immediately after removal from the donor. The solution is left in the organ vasculature during hypothermic storage and transportation (not for continuous perfusion) to the recipient.

(PLEASE DO NOT WRITE BELOW THIS LINE - CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of Device Evaluation (ODE)

Prescription Use ✓ OR Over-The-Counter Use _____
(Per 21 CFR 801.109)

David A. Feigal

(Division Sign-Off)
Division of Reproductive, Abdominal,
and Radiological Devices
510(k) Number K020924